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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/643,351 | 08/19/2003 | David G. Loucks | 03-EDP-034 | 3796 |

7590 11/24/2004

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| EXAMINER | |
|---|---|
| KRAMSKAYA, MARINA | |
| **ART UNIT** | **PAPER NUMBER** |
| 2858 | |

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/643,351 | LOUCKS, DAVID G. | |
| | Examiner | Art Unit | |
| | Marina Kramskaya | 2858 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *4 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/19/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claim 4 is objected to because of the following informalities: the "voltage difference squared" and the "current squared," based on the specification, are understood to be "summed voltage difference squared" and "summed current squared". Appropriate correction is required.

2. Claim 8 is objected to because of the following informalities: the "zero crossing" is not defined in the specification. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Vokey et al., US 4,947,469.

As per Claims 1 & 14 Vokey discloses a method of determining the impedance across a in a section of an energized power distribution system using the energizing power, the method comprising:

- measuring a first voltage (**V(a)** by Volt Meter **14A**) produced by the energizing power at a first end of the section (A) of the energized power system (FIG. 1);
- measuring a second voltage (**V(b)** by Volt Meter **14B**) produced by the energizing power at a second end of the section (B) of the energized power system (FIG> 1);
- measuring current (**I(a)** by Current Meter **16A**)through the section of the energized power system (FIG. 1) produced by the energizing power;
- determining the impedance **R(a)** as a difference between first voltage **V(a)** and the second voltage **V(b)** divided by the current **I(a)**, (column 3, lines 5-8).

As per claim 2, Vokey discloses a method of determining the impedance across a in a section of an energized power distribution system as applied to Claim 1 above.

Vokey further discloses:

measuring of the first voltage **V(a)**, the second voltage **V(b)** and the current **I(a)** is performed repeatedly multiple times, and wherein determining the impedance of the section of the power distribution system comprises summing a difference between the first and second voltages to generate a summed voltage difference and summing the current to generate a summed current for a selected

number of measurements **N** of the first voltage, the second voltage and the current, and dividing the summed voltage difference by the summed current to generate the impedance (column 3, lines 41-43) and eq. 1, line 52, where N is the number of measurements taken.

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3-8, & 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vokey in view of Godo et al., US 6,225,810.

As per Claims 3 & 15, Vokey discloses the method of determining impedance as applied to Claims 2 & 14 above. Vokey further discloses measuring of the first voltage, the second voltage, and the current.

Vokey does not disclose the power distribution system as an alternating current distribution system or sampling of the first voltage, the second voltage, and the current substantially simultaneously.

Godo discloses a power distribution system which is an AC distribution system (column 5, lines 46-48), where the current **I** and the voltages $\mathbf{V_S}$ and $\mathbf{V_B}$ are all AC and are samples simultaneously (column 4, lines 41-45).

Therefore, it would have been obvious to a person of ordinary skill in the art to apply the measuring technique, as taught by Vokey in a DC system, to an AC system, as taught by Godo, in order to implement the same measuring technique on both AC and DC systems (column 5, lines 45-49).

As per Claims 4 & 17, Vokey discloses the method of determining impedance as applied to Claims 2 & 14 above.

Vokey does not discloses squaring the sums of voltage differences or squaring the sums of the current, and then dividing the summed voltage difference squared by the summed current squared to generate a representation of the impedance.

Godo discloses summing the voltages squared (column 5, lines 2-3, in eq. 6) and summing the currents squared (column 4, line 55, in eq. 5), then dividing the summed product of voltage and current by the summed current squared to generate a representation of the impedance (column 4, line 55, in eq. 5).

Therefore, it would have been obvious to a person of ordinary skill in the art to change the equation to the sum of voltage difference squared divided by the sum of current squared, as taught by the applicant, since there are numerous representations of impedance are acceptable in the art. Therefore, it would have been obvious to square the sums of voltages and currents, as taught by Godo, in the summed voltages and currents equation of Vokey, in order to provide an averaging process of the sampled currents and voltage differences (column 5, lines 15-17).

As per Claim 5, Vokey and Godo disclose the method of determining impedance as applied to Claim 4 above.

Vokey as modified does not disclose repeating the calculations of the impedance, as in claim 4 above, to generate successive values of the impedance and including limiting changes in the successive values of the impedance.

Godo further discloses repeating the measuring process (column 6, line 56) to calculate the impedance.

Therefore, it would have been obvious for a person of ordinary skill in the art to repeat the measuring process in order to monitor the changes in the calculated values of impedance. Further, it is well known in the art to repeat and record successive values of data, the impedance in this case, and note the changes in the data.

As per Claims 6, 18, 19, Vokey and Godo disclose the method of determining impedance as applied to Claims 5 & 17 above.

Vokey as modified does not disclose limiting changes in successive values of impedance comprises changing the impedance to a preceding value of the impedance plus a value X when the impedance is more than the preceding value of the impedance, and changing the impedance to the preceding value of impedance minus the value X when the impedance is less than the preceding value of the impedance.

Godo further discloses replacing the preceding value of the impedance by adding a value (column 3, line 26, eq. 3).

Godo does not disclose replacing the preceding value of the impedance by subtracting a value X, if the impedance in less than the preceding value of impedance.

Therefore, it would be obvious to subtract the value of X when the impedance is less than the preceding value of the impedance, since the value of X is a compensating value and must be used accordingly. It would have been obvious to a person of ordinary skill to compensate for the variations in the calculated impedances as taught by Godo (eq. 3), in the impedance determining method of Vokey, in order to stabilize the output values of the successive impedance measurements.

As per Claims 7 & 20, Vokey and Godo disclose the method of determining impedance as applied to Claims 5 & 18 above.

Vokey as modified does not disclose generating the value X by multiplying a selected gain by an initial value of the impedance.

Godo further discloses generating the value X by multiplying a selected gain by an initial value of the impedance (column 3, line 26, eq. 3 & 4).

Therefore, it would have been obvious to a person of ordinary skill in the art to calculate X by multiplying the gain by the initial value of the impedance, as taught by Godo, in order to compensate for the output values of the successive impedance measurements.

As per Claim 8, Vokey and Godo disclose the method of determining impedance as applied to Claim 4 above. Godo also discloses an AC distribution system where the first voltage, second voltage, and current are all AC, as applied to Claim 3 above.

As per Claim 13, Vokey discloses the method of determining impedance as applied to Claim 1 above.

Vokey does not disclose a power distribution system energized by AC power such that the first voltage, the second voltage and the current are all AC. Further, Vokey does not disclose calculating a transformer ratio from the first AC voltage and the second AC voltage when the first ac voltage and the second AC voltage differ by a selected amount and applying the transformer ratio to one of the first AC voltage and the second AC voltage before determining the impedance.

Godo discloses an AC power distribution system where the first voltage, second voltage, and current are all AC, as applied to Claim 3 above. Godo also discloses calculating a transformer ratio ($N_S/N_D$) from the first ac voltage $V_S$ and the second ac voltage $V_D$ when the first ac voltage and the second ac voltage differ by a selected amount and applying the transformer ratio to one of the first ac voltage and the second ac voltage before determining the impedance (column 3, lines 49-54).

Therefore, it would have been obvious for a person of ordinary skill in the art to calculate the transformer ratio and apply the ration before determining impedance, as taught by Godo, in the impedance measuring method of Vokey, in order to check for the proper closing of couplers (column 3, line 58).

As per claim 16, Vokey discloses a method of determining the impedance across a in a section of an energized power distribution system as applied to Claim 14 above.

Vokey further discloses the means measuring the first voltage **14A**, the means measuring the second voltage **14B** and the means measuring the current **16A**, measure the first voltage, the second voltage and the current repeatedly ((column 3, lines 41-43) and eq. 1, line 52, where N is the number of measurements taken.), and wherein the means determining impedance comprise means repetitively calculating the impedance from the selected number of measurements of the first voltage, the second voltage, and the current (column 3, lines 41-43).

Vokey does not disclose an AC current.

Godo discloses an AC current measurement $I_{loop}$ (column 5, lines 47-48).

Therefore, it would have been obvious to a person of ordinary skill in the art to apply the measuring technique, as taught by Vokey in a DC system, to an AC system, as taught by Godo, in order to implement the same measuring technique on both AC and DC systems (column 5, lines 45-49).

7. Claims 10 & 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vokey in view of Ball, US 4,954,782.

As per Claim 10, Vokey discloses the method of determining impedance as applied to Claim 1 above. Vokey further discloses taking two spaced voltage measurements at two spaced apart points not separated by the pressure joint,

Vokey does not discloses a known fixed impedance through which current through the pressure joint flows, and dividing a difference between the two spaced apart voltage measurements by the known fixed impedance.

Ball discloses a known fixed impedance **Rr** through which current **Is** through the pressure joint flows (FIG. 2), and dividing a voltage **Vr** measurement by the known fixed impedance **Rr** (column 4, line 3). The voltage **Vr** can be represented by a difference of two spaced apart voltages $\mathbf{Vr}^{+}$ & $\mathbf{Vr}^{-}$.

Therefore, it would have been obvious to a person of ordinary skill in the art to measure the current flowing through the pressure joints by the equation as taught by Ball, in the method of Vokey, in order to calculate a more accurate current value than can be measured by an ammeter.

As per Claim 11, Vokey further discloses one of the first **V(a)** and second voltage **V(b)** measurements is used as one of the two spaced apart voltage measurements (FIG. 1).

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vokey in view of Ball, further in view of Haun et al., US 6,477,021.

Vokey discloses measuring at least one of the first voltage **V(a)**, the second voltage **V(b)** and the current **I** is performed using devices provided in the power distribution system ("local system" or "remote system" in FIG. 5).

Vokey does not disclose group of components comprising: switches, circuit breakers, contactors, network protectors, over-current relays and monitors.

Haun discloses group of components comprising: switches, circuit breakers, contactors, network protectors, over-current relays and monitors (FIG. 1).

Therefore, it would have been obvious for a person of ordinary skill in the art to use components already present in the power distribution system for current and voltage measuring purposes, as taught by Haun, in the method of measuring of Vokey, in order to minimize the number of components and reducing the complexity of the system.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tanaka et al., US 5,764,462, discloses a method of measuring impedance in a power distribution system where the current measurements are repeated, summed, and squared. Jurisch, US 6,448,780, discloses a method of calculating resistance in an AC power distribution system where the current measurements are repeated, summed, and squared.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (571)272-2233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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